



# Federal Communications Commission

## SATELLITE EARTH STATION AUTHORIZATIONS FCC Form 312 - Schedule B:(Technical and Operational Description)

FOR OFFICIAL USE ONLY

### [INSTRUCTIONS]

*1 copy of this form section exist.*

### SITE INFORMATION

Site Identifier:	Remote 1 Red Mesa,AZ	Call Sign:	
Contact Name:	Karen Leshner or John Stanford	Phone Number:	(520)656-4127
Street:	HC-61 Box 40	City:	Teec Nos Pos
	Shipping: Highway 160 Milepost 448	County:	Apache
Zipcode:	86514	State:	AZ

Area of Operation: USA

Latitude 36° 57' 43.2" N Longitude 109° 22' 56.4" W

Lat./Lon. Coordinates are: ☐ NAD-27 ☒ NAD-83 ☐ N/A

Site Elevation (AMSL): 16.7 meters

If the proposed antenna(s) operate in the Fixed Satellite Service (FSS) with geostationary satellites, do(es) the proposed antenna(s) comply with the antenna gain patterns specified in Section 25.209(a) and (b) as demonstrated by the manufacturer's qualification measurement? If NO, provide as ☐ Yes ☒ No ☐ N/A

**Exhibit 2** a technical analysis showing compliance with two-degree spacing policy.

If the proposed antenna(s) do not operate in the Fixed Satellite Service (FSS), or if they operate in the Fixed Satellite Service (FSS) with non-geostationary satellites, do(es) the proposed antenna(s) comply with the antenna gain patterns specified in Section 25.209(a2) and (b) as demonstrated by the manufacturer's qualification measurements? ☐ Yes ☒ No ☐ N/A

Is the facility operated by remote control? If YES, provide the location and telephone number of the control point. ☐ Yes ☒ No

**Remote Control**

Is frequency coordination required? If YES, attach a frequency coordination report as ☒ Yes ☐ No

**Exhibit 3**

Is coordination with another country required? If YES, attach the name of the country(ies) and plot of coordination contours as ☐ Yes ☒ No

**Attachment**

FCC Notification (See 47 CFR Part 17 and 47 CFR Part 25.112(a))

FAA Notification - (See 47 CFR Part 17 and 47 CFR part 25.115(c))

Where FAA notification is required, have you attached a copy of a completed FCC Form 854 and / or the FAA's study regarding the potential hazard of the structure to aviation? ☐ Attachment

☐ Yes ☒ No

**FAILURE TO COMPLY WITH 47 CFR PARTS 17 AND 25 WILL  
RESULT IN THE RETURN OF THIS APPLICATION.**

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☐ Antenna

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**[INSTRUCTIONS]***3 copies of this form section exist.***POINTS OF COMMUNICATION**

Site Identifier: Remote 1 Red Mesa,AZ

Satellite Name: 237 If you selected OTHER, please enter the following:

Common Name: GE 4

ITU Name:

Orbit Location: 101 W.L.

Country: USA

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Site Identifier: Remote 1 Red Mesa,AZ

Satellite Name: 237 If you selected OTHER, please enter the following:

Common Name: Galaxy 5

ITU Name:

Orbit Location: 99 W.L.

Country: USA

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**POINTS OF COMMUNICATION**

Site Identifier: Remote 1 Red Mesa,AZ

Satellite Name: 237 If you selected OTHER, please enter the following:

Common Name: Telstar 5

ITU Name:

Orbit Location: 97 W.L.

Country: USA

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Site Identifier: Remote 1 Red Mesa,AZ

Common Name:GE 4

Country:

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Site Identifier: Remote 1 Red Mesa,AZ

Common Name:GE 4

Country: USA

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## SATELLITE EARTH STATION AUTHORIZATIONS FCC Form 312 - Schedule B:(Technical and Operational Description)

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### POINTS OF COMMUNICATION (Destination Points)

Site Identifier: Remote 1 Red Mesa,AZ

Common Name:Galaxy 5

Country:

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### POINTS OF COMMUNICATION (Destination Points)

Site Identifier: Remote 1 Red Mesa,AZ

Common Name:Galaxy 5

Country: USA

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Site Identifier: Remote 1 Red Mesa,AZ

Common Name:Telstar 5

Country:

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Site Identifier: Remote 1 Red Mesa,AZ

Common Name:Telstar 5

Country: USA

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**[INSTRUCTIONS]***1 copy of this form section exist.***ANTENNA****Site Identifier: Remote 1 Red Mesa,AZ .**

Antenna ID:	Remote3.7m	Quantity:	1
Manufacturer:	Prodelin	Model:	1374-370
Diameter (meters):		3.7	
Diameter Minor (meters):			
Diameter Major (meters):			
Maximum Antenna Height Above Ground Level (meters):		4	
Maximum Antenna Height Above Mean Sea Level (meters):		20.7	
Building Height Above Ground Level (meters):			
Total Power at Antenna Flange for All Carriers(Watts):		3.9	
Maximum Antenna Height Above Rooftop (meters):			
Total EIRP for All Carriers (dBW):		50.9	

**Antenna Gain****Frequency****Frequency Coord****Previous****Menu**



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**[INSTRUCTIONS]***2 copies of this form section exist.***ANTENNA GAIN****Site Identifier: Remote 1 Red Mesa,AZ Antenna ID: Remote3.7m****Antenna Gain Transmit and/or Receive 45 dBi at 6 GHz**[Previous](#)[Menu](#)**ANTENNA GAIN****Site Identifier: Remote 1 Red Mesa,AZ Antenna ID: Remote3.7m****Antenna Gain Transmit and/or Receive 41.8 dBi at 4 GHz**[Previous](#)[Menu](#)

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**[INSTRUCTIONS]***20 copies of this form section exist.***FREQUENCY****Site Identifier: Remote 1 Red Mesa,AZ Antenna ID:Remote3.7m**

Frequency Lower ( MHz ) : 4190	Frequency Upper ( MHz ) :	4200
T/R Mode: R	Polarization: Z	Emission Designator: 6M0G7D
Maximum EIRP per Carrier (dBW):		
Maximum EIRP Density per Carrier (dBW):		
Modulation : QPSK, 3/4 RATE FEC-DATA		

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Frequency Lower ( MHz ) : 4190	Frequency Upper ( MHz ) :	4200
T/R Mode: R	Polarization: Z	Emission Designator: 360KG7D
Maximum EIRP per Carrier (dBW):		
Maximum EIRP Density per Carrier (dBW):		
Modulation : BPSK, 1/2 FEC DATA		

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### FREQUENCY

Site Identifier: Remote 1 Red Mesa,AZ Antenna ID:Remote3.7m

Frequency Lower ( MHz ) : 4190	Frequency Upper ( MHz ) : 4200
T/R Mode: R      Polarization: Z	Emission Designator: 520KG7D
Maximum EIRP per Carrier (dBW):	
Maximum EIRP Density per Carrier (dBW):	
Modulation : QPSK, 3/4 FEC DATA	

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### FREQUENCY

Site Identifier: Remote 1 Red Mesa,AZ Antenna ID:Remote3.7m

Frequency Lower ( MHz ) : 4020	Frequency Upper ( MHz ) : 4040
T/R Mode: R      Polarization: Z	Emission Designator: 6M0G7D
Maximum EIRP per Carrier (dBW):	
Maximum EIRP Density per Carrier (dBW):	
Modulation : QPSK, 3/4 RATE FEC-DATA	

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### FREQUENCY

Site Identifier: Remote 1 Red Mesa,AZ Antenna ID:Remote3.7m

Frequency Lower ( MHz ) : 4020	Frequency Upper ( MHz ) : 4040
T/R Mode: R      Polarization: Z	Emission Designator: 360KG7D
Maximum EIRP per Carrier (dBW):	
Maximum EIRP Density per Carrier (dBW):	
Modulation : BPSK, 1/2 FEC DATA	

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**FREQUENCY****Site Identifier: Remote 1 Red Mesa,AZ Antenna ID:Remote3.7m**

Frequency Lower ( MHz ) : 4020	Frequency Upper ( MHz ) :	4040
T/R Mode: R	Polarization: Z	Emission Designator: 520KG7D
Maximum EIRP per Carrier (dBW):		
Maximum EIRP Density per Carrier (dBW):		
Modulation : QPSK, 3/4 FEC DATA		

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Frequency Lower ( MHz ) : 3940	Frequency Upper ( MHz ) :	3960
T/R Mode: R	Polarization: Z	Emission Designator: 6M0G7D
Maximum EIRP per Carrier (dBW):		
Maximum EIRP Density per Carrier (dBW):		
Modulation : QPSK, 3/4 RATE FEC-DATA		

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Frequency Lower ( MHz ) : 3940	Frequency Upper ( MHz ) :	3960
T/R Mode: R	Polarization: Z	Emission Designator: 360KG7D
Maximum EIRP per Carrier (dBW):		
Maximum EIRP Density per Carrier (dBW):		
Modulation : BPSK, 1/2 FEC DATA		

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**FREQUENCY****Site Identifier: Remote 1 Red Mesa,AZ Antenna ID:Remote3.7m**

Frequency Lower ( MHz ) : 3940	Frequency Upper ( MHz ) : 3960
T/R Mode: R      Polarization: Z	Emission Designator: 520KG7D
Maximum EIRP per Carrier (dBW):	
Maximum EIRP Density per Carrier (dBW):	
Modulation : QPSK, 3/4 FEC DATA	

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Frequency Lower ( MHz ) : 3700	Frequency Upper ( MHz ) : 3710
T/R Mode: R      Polarization: Z	Emission Designator: 6M0G7D
Maximum EIRP per Carrier (dBW):	
Maximum EIRP Density per Carrier (dBW):	
Modulation : QPSK, 3/4 RATE FEC-DATA	

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Frequency Lower ( MHz ) : 3700	Frequency Upper ( MHz ) : 3710
T/R Mode: R      Polarization: Z	Emission Designator: 360KG7D
Maximum EIRP per Carrier (dBW):	
Maximum EIRP Density per Carrier (dBW):	
Modulation : BPSK, 1/2 FEC DATA	

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Frequency Lower ( MHz ) : 3700	Frequency Upper ( MHz ) :	3710
T/R Mode: R	Polarization: Z	Emission Designator: 520KG7D
Maximum EIRP per Carrier (dBW):		
Maximum EIRP Density per Carrier (dBW):		
Modulation : QPSK, 3/4 FEC DATA		

[Previous](#) [Menu](#)**FREQUENCY****Site Identifier: Remote 1 Red Mesa,AZ Antenna ID:Remote3.7m**

Frequency Lower ( MHz ) : 6415	Frequency Upper ( MHz ) :	6425
T/R Mode: T	Polarization: Z	Emission Designator: 360KG7D
Maximum EIRP per Carrier (dBW): 49.3		
Maximum EIRP Density per Carrier (dBW): 29.8		
Modulation : BPSK, 1/2 RATE FEC-DATA		

[Previous](#) [Menu](#)**FREQUENCY****Site Identifier: Remote 1 Red Mesa,AZ Antenna ID:Remote3.7m**

Frequency Lower ( MHz ) : 6415	Frequency Upper ( MHz ) :	6425
T/R Mode: T	Polarization: Z	Emission Designator: 520KG7D
Maximum EIRP per Carrier (dBW):	50.9	
Maximum EIRP Density per Carrier (dBW):	29.8	
Modulation :	QPSK, 3/4 RATE FEC-DATA	

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### FREQUENCY

Site Identifier: Remote 1 Red Mesa,AZ Antenna ID:Remote3.7m

Frequency Lower ( MHz ) : 6245	Frequency Upper ( MHz ) :	6265
T/R Mode: T	Polarization: Z	Emission Designator: 360KG7D
Maximum EIRP per Carrier (dBW):	49.3	
Maximum EIRP Density per Carrier (dBW):	29.8	
Modulation :	BPSK, 1/2 RATE FEC-DATA	

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### FREQUENCY

Site Identifier: Remote 1 Red Mesa,AZ Antenna ID:Remote3.7m

Frequency Lower ( MHz ) : 6245	Frequency Upper ( MHz ) :	6265
T/R Mode: T	Polarization: Z	Emission Designator: 520KG7D
Maximum EIRP per Carrier (dBW):	50.9	
Maximum EIRP Density per Carrier (dBW):	29.8	
Modulation :	QPSK, 3/4 RATE FEC-DATA	

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**FREQUENCY****Site Identifier: Remote 1 Red Mesa,AZ Antenna ID:Remote3.7m**

Frequency Lower ( MHz ) : 6165	Frequency Upper ( MHz ) :	6185
T/R Mode: T	Polarization: Z	Emission Designator: 360KG7D
Maximum EIRP per Carrier (dBW):	49.3	
Maximum EIRP Density per Carrier (dBW):	29.8	
Modulation :	BPSK, 1/2 RATE FEC-DATA	

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Frequency Lower ( MHz ) : 6165	Frequency Upper ( MHz ) :	6185
T/R Mode: T	Polarization: Z	Emission Designator: 520KG7D
Maximum EIRP per Carrier (dBW):	50.9	
Maximum EIRP Density per Carrier (dBW):	29.8	
Modulation :	QPSK, 3/4 RATE FEC-DATA	

[Previous](#)[Menu](#)**FREQUENCY****Site Identifier: Remote 1 Red Mesa,AZ Antenna ID:Remote3.7m**

Frequency Lower ( MHz ) : 5925	Frequency Upper ( MHz ) :	5935
T/R Mode: T	Polarization: Z	Emission Designator: 360KG7D
Maximum EIRP per Carrier (dBW):	49.3	
Maximum EIRP Density per Carrier (dBW):	29.8	
Modulation :	BPSK, 1/2 RATE FEC-DATA	

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**FREQUENCY****Site Identifier: Remote 1 Red Mesa,AZ Antenna ID:Remote3.7m**

Frequency Lower ( MHz ) : 5925	Frequency Upper ( MHz ) :	5935
T/R Mode: T	Polarization: Z	Emission Designator: 520KG7D
Maximum EIRP per Carrier (dBW):	50.9	
Maximum EIRP Density per Carrier (dBW):	29.8	
Modulation :	QPSK, 3/4 RATE FEC-DATA	

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**[INSTRUCTIONS]**

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**FREQUENCY COORD**

**Site Identifier: Remote 1 Red Mesa,AZ Antenna ID: Remote3.7m**

Satellite Orbit Type:	G
Lower Frequency Limit ( MHz ) :	4190
Upper Frequency Limit ( MHz ) :	4200
Range of Satellite Arc Eastern Limit:	97 E
Range of Satellite Arc Western Limit:	101 W
Earth Station Azimuth Angle Eastern Limit:	159.9
Antenna Elevation Angle Eastern Limit:	45.2
Earth Station Azimuth Angle Western Limit:	166.2
Antenna Elevation Angle Western Limit:	46.2
Maximum EIRP Density toward the Horizon (dBW/4KHz):	

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**FREQUENCY COORD**

**Site Identifier: Remote 1 Red Mesa,AZ Antenna ID: Remote3.7m**

Satellite Orbit Type:	G
Lower Frequency Limit ( MHz ) :	4020
Upper Frequency Limit ( MHz ) :	4040
Range of Satellite Arc Eastern Limit:	97 E
Range of Satellite Arc Western Limit:	101 W
Earth Station Azimuth Angle Eastern Limit:	159.9
Antenna Elevation Angle Eastern Limit:	45.2
Earth Station Azimuth Angle Western Limit:	166.2
Antenna Elevation Angle Western Limit:	46.2

Maximum EIRP Density toward the Horizon  
(dBW/4KHz):

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### FREQUENCY COORD

Site Identifier: Remote 1 Red Mesa,AZ Antenna ID: Remote3.7m

Satellite Orbit Type:	G
Lower Frequency Limit ( MHz ) :	3940
Upper Frequency Limit ( MHz ) :	3960
Range of Satellite Arc Eastern Limit:	97 E
Range of Satellite Arc Western Limit:	101 W
Earth Station Azimuth Angle Eastern Limit:	159.9
Antenna Elevation Angle Eastern Limit:	45.2
Earth Station Azimuth Angle Western Limit:	166.2
Antenna Elevation Angle Western Limit:	46.2
Maximum EIRP Density toward the Horizon (dBW/4KHz):	

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### FREQUENCY COORD

Site Identifier: Remote 1 Red Mesa,AZ Antenna ID: Remote3.7m

Satellite Orbit Type:	G
Lower Frequency Limit ( MHz ) :	3700
Upper Frequency Limit ( MHz ) :	3710
Range of Satellite Arc Eastern Limit:	97 E
Range of Satellite Arc Western Limit:	101 W
Earth Station Azimuth Angle Eastern Limit:	159.9
Antenna Elevation Angle Eastern Limit:	45.2
Earth Station Azimuth Angle Western Limit:	166.2
Antenna Elevation Angle Western Limit:	46.2
Maximum EIRP Density toward the Horizon (dBW/4KHz):	

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### FREQUENCY COORD

Site Identifier: Remote 1 Red Mesa,AZ Antenna ID: Remote3.7m

Satellite Orbit Type:	G
Lower Frequency Limit ( MHz ) :	6415
Upper Frequency Limit ( MHz ) :	6425
Range of Satellite Arc Eastern Limit:	97 E
Range of Satellite Arc Western Limit:	101 W
Earth Station Azimuth Angle Eastern Limit:	159.9
Antenna Elevation Angle Eastern Limit:	45.2
Earth Station Azimuth Angle Western Limit:	166.2
Antenna Elevation Angle Western Limit:	46.2
Maximum EIRP Density toward the Horizon (dBW/4KHz):	-24.6

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### FREQUENCY COORD

Site Identifier: Remote 1 Red Mesa,AZ Antenna ID: Remote3.7m

Satellite Orbit Type:	G
Lower Frequency Limit ( MHz ) :	6245
Upper Frequency Limit ( MHz ) :	6265
Range of Satellite Arc Eastern Limit:	97 E
Range of Satellite Arc Western Limit:	101 W
Earth Station Azimuth Angle Eastern Limit:	159.9
Antenna Elevation Angle Eastern Limit:	45.2
Earth Station Azimuth Angle Western Limit:	166.2
Antenna Elevation Angle Western Limit:	46.2
Maximum EIRP Density toward the Horizon (dBW/4KHz):	-24.6

[Previous](#)[Menu](#)**FREQUENCY COORD****Site Identifier: Remote 1 Red Mesa,AZ Antenna ID: Remote3.7m**

Satellite Orbit Type:	G
Lower Frequency Limit ( MHz ) :	6165
Upper Frequency Limit ( MHz ) :	6185
Range of Satellite Arc Eastern Limit:	97 E
Range of Satellite Arc Western Limit:	101 W
Earth Station Azimuth Angle Eastern Limit:	159.9
Antenna Elevation Angle Eastern Limit:	45.2
Earth Station Azimuth Angle Western Limit:	166.2
Antenna Elevation Angle Western Limit:	46.2
Maximum EIRP Density toward the Horizon (dBW/4KHz):	-24.6

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Satellite Orbit Type:	G
Lower Frequency Limit ( MHz ) :	5925
Upper Frequency Limit ( MHz ) :	5935
Range of Satellite Arc Eastern Limit:	97 E
Range of Satellite Arc Western Limit:	101 W
Earth Station Azimuth Angle Eastern Limit:	159.9
Antenna Elevation Angle Eastern Limit:	45.2
Earth Station Azimuth Angle Western Limit:	166.2
Antenna Elevation Angle Western Limit:	46.2
Maximum EIRP Density toward the Horizon (dBW/4KHz):	-24.6

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# ATTACHMENT 1

## Onsat 3.7 Meter Antenna Radiation Analysis

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### 3.7 Meter C Band Antenna.

Pursuant to CFR 47 FCC Part 1, Section 1307, and Paragraphs 94 and 95 of the Commission's Memorandum, Opinion and Order in Docket No. 16495, 38 FCC 2<sup>nd</sup> 665 (1972), the following is a showing that operation of the Earth Station facilities proposed herein will comply with the standards set forth by the Department of Labor, pursuant to the Occupational Safety and Health Act of 1970 and moreover, adheres to the newer ANSI Standard (ANSI C95.1-1982) and FCC Report and Order Gen Docket 79-144, adopted February 12, 1985 and released March 14, 1985 for the protection of employees and the general public against excess levels of non-ionizing radiation.

A safety study of the environment in and around the proposed Antenna shows all areas normally accessible to personnel exhibit predicted power density levels less than 1 mW/cm<sup>2</sup> under nominal operating conditions.

Regions between the Antenna feed and the reflector also exhibit predicted power density levels less than 1 mW/cm<sup>2</sup>.

#### 1. Earth Station Site Parameters:

Antenna	Prodelin Model 1374-370
Diameter:	3.7 meters
Main Beam Gain:	45.0 dBi
Antenna Patterns Conforms to:	29-25log(Theta) for Theta > 1.5°
Antenna Efficiency in Near Field:	0.58
Antenna Efficiency in Far Field:	0.58
Transmit Frequency:	6.0 GHz
Highest Transmit Frequency:	6.5 GHz
Maximum HPA Power Output:	5 Watts
Nominal HPA Power Output for	
Sum of All Carriers:	3.9 Watts

#### 2. Formulas and Methods Used in Computation:

Unless otherwise noted, the formulas noted with the computation apply.

#### 3. Radiation Limits:

The following limits are assumed:

5 mW/cm<sup>2</sup> = 50 W/m<sup>2</sup> for periods not exceeding 0.1 hour (6 min.)

1 mW/cm<sup>2</sup> = 10 W/m<sup>2</sup> for indefinite periods.

#### 4. Near Field Evaluation:

The majority of the radiation energy is assumed to be contained within a cylinder concentric about the main beam out to a distance of:

$$\text{Distance in meters} = D^2 / (4 * L)$$

Where:

D = Antenna Diameter	3.7 meters
F = Highest Frequency Considered	6500 MHz
L = Lambda = 300/F [MHz]	0.046

For the above Antenna operating at 6500 MHz:

$$\text{Distance (m): } 74.4 = (3.7)^2 / (4 * 0.046)$$

The maximum power density within this cylinder is taken to be independent of the distance.

$$\text{PDmax. In mW/cm}^2 = 16 * P_t * \text{Effic.} / \pi * D^2 * 10$$

Where:

P <sub>t</sub> = Power applied to Antenna:	5 Watts maximum
	3.9 Watts nominal

For the above mentioned Antenna:

Near Field Power Density (Maximum) in mW/cm <sup>2</sup> :	$.11 = \frac{16 * 5 * 0.58}{\pi * (3.7)^2 * 10}$
---	--

Near Field Power Density (Nominal) in mW/cm <sup>2</sup> :	$.084 = \frac{16 * 3.9 * 0.58}{\pi * (3.7)^2 * 10}$
---	---

Thus all power limits are within prescribed limits.

#### 5. Far Field Evaluation:

For distances increasing beyond the near field region, The power density decreases to values predicted from the far field pattern,  $29-25 \log(\Theta)$ , power applied to the antenna and antenna size. A minimum elevation angle of 5 degrees is assumed.

$$\text{PDF} = \text{PF} * P_t / 4 * \pi * D^2 * 10 \text{ (mW/cm}^2\text{)}$$



Where:

PDf = Power Density in the Far Field  
G = 29-25log (Theta) = 11.52 dBi  
PF = Power Factor i.e.: Antilog (G/10) = 14.2  
Pt = Power Applied to the Antenna in Watts  
D = Distance in meters

The conservative assumption is taken that the full Antenna gain is achieved at the near field limit (74.4 meters), as calculated in paragraph (4).

Thus, the predicted far field power densities 5 degrees off the main beam axis are as follows:

Maximum Power Density in the Far Field in mW/cm<sup>2</sup>:

$$0.0001 = \frac{14.2 * 5}{4 * \pi * (74.4)^2 * 10}$$

Nominal Power Density in the Far Field in mW/cm<sup>2</sup>:

$$0.00008 = \frac{14.2 * 3.9}{4 * \pi * (74.4)^2 * 10}$$

Summary:

All Power Densities are well within established guidelines.

Certification:

I hereby certify that I am the technically qualified person responsible for the preparation of the radiation hazard assessment, and that I have reviewed this radiation hazard assessment, and that it is complete and correct to the best of my knowledge.

Sidney M. Skjei  
President  
Skjei Telecom, Inc.

## ATTACHMENT 2

### TECHNICAL ANALYSIS SHOWING COMPLIANCE WITH 2 DEGREE SPACING POLICY

Power Flux Density And Eirp Density – Comparison Of Onsat 3.7 Meter And 4.5 Meter Antennas

Item	4.5 meter	3.7 meter
Maximum Gain (60% efficiency) @ 6 GHz-dB	46.7	45.0
Allowed power density into 4.5 meter (25.212 d)-dBW/4kHz	-2.7	
Allowed EIRP density out of 4.5 meter (note 1)-dBQ/4kHz	44.0	
Maximum EIRP (OnSat 3.7 meter)-dBW		50.9
Maximum EIRP density out of 3.7 meter (note 2)-dBW/4kHz		29.8
Maximum power density into 3.7 meter (note 1)-dBW/4kHz		-15.2
Gain of 4.5 meter @ +/- 1 degree from max. (note 3)- dB	29.0	
Gain of 3.7 meter @ +/- 1 degree from max. (from pattern)- dB		31
Allowed EIRP density 4.5 meter @ +/- 1 degree – dBW/4kHz	26.3	
EIRP density 3.7 meter @ +/- 1 degree – dBW/4kHz		15.8

Notes:

1. EIRP density = Power Density into antenna + Antenna Gain
2. EIRP density = EIRP +  $10 \log 4/520 = 50.9 - 21.1 = 29.8$
3. From 25.20:  $29 - 25 \log 1 = 29 - 0 = 29.0$  dB

**The EIRP density per 4 kHz from the OnSat 3.7 meter antenna is 10.5 dB (10 times) less than that which is allowed form a compliant 4.5 meter antenna at 1 degree from maximum gain.**

FREQUENCY COORDINATION AND INTERFERENCE  
ANALYSIS REPORT

PREPARED FOR  
ONSAT NETWORK COMMUNICATIONS, INC.  
RED MESA, AZ  
SATELLITE EARTH STATION

PREPARED BY  
COMSEARCH  
2002 EDMUND HALLEY DRIVE  
RESTON, VIRGINIA 20191  
July 21, 2000

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## 1. CONCLUSIONS

AN INTERFERENCE STUDY CONSIDERING ALL EXISTING, PROPOSED AND PRIOR COORDINATED MICROWAVE FACILITIES WITHIN THE COORDINATION CONTOURS OF THE PROPOSED EARTH STATION DEMONSTRATES THAT THIS SITE WILL OPERATE SATISFACTORILY WITH THE COMMON CARRIER MICROWAVE ENVIRONMENT. FURTHER, THERE WILL BE NO RESTRICTIONS OF ITS OPERATION DUE TO INTERFERENCE CONSIDERATIONS.

## 2. SUMMARY OF RESULTS

A NUMBER OF GREAT CIRCLE INTERFERENCE CASES WERE IDENTIFIED DURING THE INTERFERENCE STUDY OF THE PROPOSED EARTH STATION. EACH OF THE CASES WHICH EXCEEDED THE INTERFERENCE OBJECTIVE ON A LINE-OF-SIGHT BASIS WAS PROFILED AND THE PROPAGATION LOSSES ESTIMATED USING NBS TN101 (REVISED) TECHNIQUES. THE LOSSES WERE FOUND TO BE SUFFICIENT TO REDUCE THE SIGNAL LEVELS TO ACCEPTABLE MAGNITUDES IN EVERY CASE.

THE FOLLOWING COMPANIES REPORTED POTENTIAL GREAT CIRCLE INTERFERENCE CONFLICTS WHICH DID NOT MEET THE OBJECTIVES ON A LINE-OF-SIGHT BASIS. WHEN OVER-THE-HORIZON LOSSES ARE CONSIDERED ON THE INTERFERING PATHS, SUFFICIENT BLOCKAGE EXISTS TO NEGATE HARMFUL INTERFERENCE FROM OCCURRING WITH THE PROPOSED TRANSMIT AND RECEIVE EARTH STATION.

### COMPANY

NAVAJO COMMUNICATIONS COMPANY

NO OTHER CARRIERS REPORTED POTENTIAL INTERFERENCE CASES.

3. SUPPLEMENTAL SHOWING  
RE: PART 25.203(C)

PURSUANT TO PART 25.203(C) OF THE FCC RULES AND REGULATIONS,  
THE SATELLITE EARTH STATION PROPOSED IN THIS APPLICATION  
WAS COORDINATED BY COMSEARCH USING COMPUTER TECHNIQUES  
AND IN ACCORDANCE WITH PART 25 OF THE FCC RULES AND  
REGULATIONS.

COORDINATION DATA FOR THIS EARTH STATION WAS SENT TO THE  
BELOW LISTED CARRIERS WITH A LETTER DATED JUNE 30, 2000.

ARIZONA PUBLIC SERVICE COMPANY  
CITIZENS COMMUNICATIONS CO. OF UTAH  
CNG COMMUNICATIONS, INC.  
NAVAJO COMMUNICATIONS COMPANY  
NAVAJO TRIBAL UTILITY AUTHORITY  
NORTHERN NEW MEXICO LIMITED PARTNERSHIP  
US WEST COMMUNICATIONS, INC.

#### 4. EARTH STATION COORDINATION DATA

THIS SECTION PRESENTS THE DATA PERTINENT TO FREQUENCY COORDINATION OF THE PROPOSED EARTH STATION WHICH WAS CIRCULATED TO ALL COMMON CARRIERS WITHIN ITS COORDINATION CONTOURS.



SATELLITE EARTH STATION  
FREQUENCY COORDINATION DATA  
06/29/2000

Company	ONSAT NETWORK COMMUNICATIONS, INC	
Owner code	ONSNET	
Earth Station Name, State	RED MESA, AZ	
Latitude (DMS) (NAD83)	36 57 43.2 N	
Longitude (DMS) (NAD83)	109 22 54.0 W	
Ground Elevation AMSL (Ft/m)	5418.24 / 1651.40	
Antenna Centerline AGL (Ft/m)	8.99 / 2.74	

Receive Antenna Type:	FCC32	Prodelin
		Series 1374
4.0 GHz Gain (dBi) / Diameter (m)		40.9 / 3.7
3 dB / 15 dB Half Beamwidth		0.70 / 1.20

Transmit Antenna Type:	FCC32	Prodelin
		Series 1374
6.0 GHz Gain (dBi) / Diameter (m)		44.7 / 3.7
3 dB / 15 dB Half Beamwidth		0.55 / 1.10

Operating Mode	TRANSMIT AND RECEIVE			
Modulation	DIGITAL			
Emission / Receive Band (MHz)	409KG7D - 4M80G7D	/	3700.0000 - 3710.0000	
	409KG7D - 4M80G7D	/	3940.0000 - 3960.0000	
	409KG7D - 4M80G7D	/	4020.0000 - 4040.0000	
	409KG7D - 4M80G7D	/	4190.0000 - 4200.0000	
Emission / Transmit Band (MHz)	205KG7D - 409KG7D	/	5925.0000 - 5935.0000	
	205KG7D - 409KG7D	/	6165.0000 - 6185.0000	
	205KG7D - 409KG7D	/	6245.0000 - 6265.0000	
	205KG7D - 409KG7D	/	6415.0000 - 6425.0000	

Max. Available RF Power (dBW)/4 kHz)	-13.40
(dBW)/MHz)	10.60

Max. EIRP (dBW)/4 kHz)	31.30
(dBW)/MHz)	55.30

Max permissible Interference Power	
4.0 GHz, 20% (dBW/1 MHz)	-156.0
4.0 GHz, 0.0100% (dBW/1 MHz)	-146.0
6.0 GHz, 20% (dBW/4 kHz)	-154.0
6.0 GHz, 0.0025% (dBW/4 kHz)	-131.0

Range of Satellite Arc (Geostationary)	
Degrees Longitude	97.0 W / 101.0 W
Azimuth Range (Min/Max)	159.9 / 166.2
Corresponding Elevation Angles	45.2 / 46.2

Radio Climate	A
Rain Zone	5

Max Great Circle Coordination Distance (Mi/Km)	
4.0 GHz	177.3 / 285.4
6.0 GHz	82.8 / 133.3

Precipitation Scatter Contour Radius (Mi/Km)	
4.0 GHz	62.1 / 100.0
6.0 GHz	62.1 / 100.0

Table of Earth Station Coordination Values  
06/29/2000

Earth Station Name      RED MESA AZ  
 Owner                    ONSAT NETWORK COMMUNICATIONS, INC  
 Latitude (DMS) (NAD83) 36 57 43.2 N  
 Longitude (DMS) (NAD83) 109 22 54.0 W  
 Ground Elevation (Ft/m)      5418.24 /      1651.40 AMSL  
 Antenna Centerline (Ft/m)      8.99 /      2.74 AGL  
 Antenna Model              Prodelin 3.7 Meter  
 Objectives: Receive      -156.0 (dBW /1 MHz)  
                  Transmit      -154.0 (dBW /4 kHz)      TX Power      -13.4 (dBW/4 kHz)

Azimuth (Deg)	Horizon Elevation Angle (Deg)	Antenna Disc. Angle (Deg)	Antenna Gain (dBi)	4.0 GHz Coordination Distance (Km)	Antenna Gain (dBi)	6.0 GHz Coordination Distance (Km)
0	3.38	134.45	-10.00	160.8	-10.00	100.0
5	3.44	132.53	-10.00	159.5	-10.00	100.0
10	3.48	130.26	-10.00	158.7	-10.00	100.0
15	3.53	127.71	-10.00	157.7	-10.00	100.0
20	3.60	124.93	-10.00	156.0	-10.00	100.0
25	3.69	121.95	-10.00	154.1	-10.00	100.0
30	3.79	118.80	-10.00	152.0	-10.00	100.0
35	3.91	115.50	-10.00	149.7	-10.00	100.0
40	4.03	112.08	-10.00	147.5	-10.00	100.0
45	4.15	108.55	-10.00	145.5	-10.00	100.0
50	4.27	104.94	-10.00	143.7	-10.00	100.0
55	4.39	101.26	-10.00	141.9	-10.00	100.0
60	4.52	97.53	-10.00	140.1	-10.00	100.0
65	4.63	93.76	-10.00	138.5	-10.00	100.0
70	4.73	89.96	-10.00	137.1	-10.00	100.0
75	4.82	86.15	-10.00	135.9	-10.00	100.0
80	4.87	82.35	-10.00	135.2	-10.00	100.0
85	4.92	78.57	-10.00	134.6	-10.00	100.0
90	4.95	74.82	-10.00	134.2	-10.00	100.0
95	4.97	71.13	-10.00	134.0	-10.00	100.0
100	4.97	67.52	-10.00	134.0	-10.00	100.0
105	4.98	63.98	-10.00	135.1	-10.00	100.0
110	4.97	60.57	-10.00	134.0	-10.00	100.0
115	4.95	57.30	-10.00	134.2	-10.00	100.0
120	4.91	54.20	-10.00	134.7	-10.00	100.0
125	4.86	51.32	-10.00	135.4	-10.00	100.0
130	4.80	48.70	-10.00	136.2	-10.00	100.0
135	4.76	46.35	-9.65	138.2	-9.65	100.0
140	4.71	44.35	-9.17	140.9	-9.17	100.0
145	4.66	42.74	-8.77	143.3	-8.77	100.0
150	4.61	41.57	-8.47	145.4	-8.47	100.0
155	4.56	40.87	-8.28	147.0	-8.28	100.0
160	4.51	40.67	-8.23	148.0	-8.23	100.0
165	4.45	40.99	-8.32	148.6	-8.32	100.0
170	4.41	41.78	-8.53	148.2	-8.53	100.0
175	4.38	42.59	-8.73	147.8	-8.73	100.0
180	0.00	47.78	-9.98	285.3	-9.98	133.2

Table of Earth Station Coordination Values  
06/29/2000

Earth Station Name        RED MESA AZ  
 Owner                    ONSAT NETWORK COMMUNICATIONS, INC  
 Latitude (DMS) (NAD83) 36 57 43.2 N  
 Longitude (DMS) (NAD83) 109 22 54.0 W  
 Ground Elevation (Ft/m)    5418.24 /    1651.40 AMSL  
 Antenna Centerline (Ft/m)    8.99 /        2.74 AGL  
 Antenna Model            Prodelin 3.7 Meter  
 Objectives: Receive       -156.0 (dBW /1 MHz)  
                  Transmit   -154.0 (dBW /4 kHz)    TX Power    -13.4 (dBW/4 kHz)

Azimuth (Deg)	Horizon Elevation Angle (Deg)	Antenna Disc. Angle (Deg)	Antenna Gain (dBi)	4.0 GHz Coordination Distance (Km)	Antenna Gain (dBi)	6.0 GHz Coordination Distance (Km)
185	4.30	45.22	-9.38	146.0	-9.38	100.0
190	4.27	47.11	-9.83	144.5	-9.83	100.0
195	4.26	49.33	-10.00	143.9	-10.00	100.0
200	4.29	51.80	-10.00	143.5	-10.00	100.0
205	4.33	54.52	-10.00	142.8	-10.00	100.0
210	4.38	57.46	-10.00	142.1	-10.00	100.0
215	4.41	60.58	-10.00	141.6	-10.00	100.0
220	4.46	63.84	-10.00	141.0	-10.00	100.0
225	4.49	67.23	-10.00	140.4	-10.00	100.0
230	4.53	70.73	-10.00	139.9	-10.00	100.0
235	4.56	74.30	-10.00	139.5	-10.00	100.0
240	4.58	77.94	-10.00	139.2	-10.00	100.0
245	4.59	81.63	-10.00	139.1	-10.00	100.0
250	4.59	85.34	-10.00	139.1	-10.00	100.0
255	4.58	89.08	-10.00	139.2	-10.00	100.0
260	4.56	92.81	-10.00	139.5	-10.00	100.0
265	4.53	96.53	-10.00	139.9	-10.00	100.0
270	4.49	100.23	-10.00	140.5	-10.00	100.0
275	4.44	103.88	-10.00	141.3	-10.00	100.0
280	4.38	107.47	-10.00	142.1	-10.00	100.0
285	4.31	110.98	-10.00	143.1	-10.00	100.0
290	4.23	114.40	-10.00	144.3	-10.00	100.0
295	4.15	117.70	-10.00	145.5	-10.00	100.0
300	4.07	120.85	-10.00	146.8	-10.00	100.0
305	3.98	123.83	-10.00	148.3	-10.00	100.0
310	3.89	126.60	-10.00	150.0	-10.00	100.0
315	3.81	129.14	-10.00	151.6	-10.00	100.0
320	3.74	131.41	-10.00	153.1	-10.00	100.0
325	3.65	133.34	-10.00	155.0	-10.00	100.0
330	3.55	134.90	-10.00	157.2	-10.00	100.0
335	3.45	136.05	-10.00	159.2	-10.00	100.0
340	3.37	136.78	-10.00	161.1	-10.00	100.0
345	3.30	137.06	-10.00	162.7	-10.00	100.0
350	3.30	136.94	-10.00	162.8	-10.00	100.0
355	3.33	136.00	-10.00	162.0	-10.00	100.0

5. CERTIFICATION

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE FREQUENCY COORDINATION DATA CONTAINED IN THIS APPLICATION, THAT I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS, THAT I HAVE EITHER PREPARED OR REVIEWED THE FREQUENCY COORDINATION DATA SUBMITTED WITH THIS APPLICATION, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY:



GARY K. EDWARDS  
MANAGER SATELLITE SERVICES  
COMSEARCH  
2002 EDMUND HALLEY DRIVE  
RESTON, VIRGINIA 20191

DATED: July 21, 2000

## **FCC IBFS - Electronic Filing**

**Submission\_id :IB2000000538**  
**Successfully filed on :Jul 25 2000 2:57PM**

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JUL 25 2000

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

July 25, 2000

## VIA HAND DELIVERY

Magalie Roman Salas  
Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street S.W.  
Room TW-A325  
Washington D.C. 20554

Re: Petition Of OnSat Network Communications, Inc. for Declaratory Order and Waiver and  
Request for Expedited Action  
SAT-PDR-19990910-00091

Dear Ms. Salas:

Attached is OnSat Network Communication's first application for streamlined authority to operate a bidirectional C-Band broadband service to rural America. We hope that the Commission will act quickly to approve this application and the follow-on requests OnSat will make to extend its network. This application, which has been reviewed and informally approved by Commission staff, reflects the understanding reached by OnSat and the Fixed Wireless Communications Coalition on streamlined C-Band earth station licensing, as discussed in my letter of February 10 (attached) and the Fixed Wireless communications Coalition's letter of February 14 (attached) of this year, both filed in the above-captioned docket. This application has been filed electronically today and OnSat is remitting a fee of \$13,470. This sum greatly exceeds what is normally required for a Form 312 application, but it is what Commission staff has told OnSat it must pay for the "lead" streamlined C-Band application (it is, apparently, a composite of the fees for VSAT, equitorial, and earth station fees). The submission ID is IB2000000538.

Please address any questions to the undersigned.

Sincerely yours,



Ellen P. Goodman

Attorney for  
OnSat Network Communications, Inc.

Exhibit A

## COVINGTON &amp; BURLING

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WASHINGTON DC 20004-2401  
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JUL 25 2000

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

July 25, 2000

VIA HAND DELIVERY

Magalie Roman Salas  
Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street S.W.  
Room TW-A325  
Washington D.C. 20554

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SAT-PDR-19990910-00091

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Please address any questions to the undersigned.

Sincerely yours,



Ellen P. Goodman

Attorney for  
**OnSat Network Communications, Inc.**



**COVINGTON & BURLING**

Ms. Salas

July 25, 2000

Page 2

cc: Ari Fitzgerald  
Richard Engleman  
Julia Buchanan  
John Giusti  
Linda Haller  
Thomas Tycz  
Ronald Rapasi  
George Sharp  
Leonard Robert Raish  
Mitchell Lazarus

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JAMES P. RILEY  
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JENNIFER DINE WAGNER  
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February 14, 2000

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CONSULTANT FOR INTERNATIONAL AND  
INTERGOVERNMENTAL AFFAIRS  
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**BY HAND DELIVERY**

Ms. Magalie Salas, Secretary  
Federal Communications Commission  
445 12th Street, SW, Room TW-B204  
Washington, DC 20554

**Re: Onsat Network Communications, Inc., File No. SAT-PDR-199990910-00091**

Dear Ms. Salas:

On October 25, 1999, the Fixed Wireless Communications Coalition (FWCC) opposed Onsat's petition in the above-referenced matter.

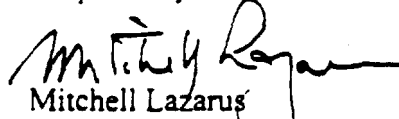
On February 10, 2000, following discussions with the FWCC, Onsat filed an amendment to its petition that takes account of the FWCC's concerns.

In light of Onsat's amendment, the FWCC now withdraws its opposition.

Kindly date-stamp and return the extra copy of this letter.

If there are any questions about this filing, please call me at the number above.

Respectfully submitted,



Mitchell Lazarus

Counsel for the Fixed Wireless Communications Coalition

ML:deb

cc: Ellen P. Goodman, Esq.  
Ari Fitzgerald  
Richard Engieman  
Julia Buchanan  
John Giusti  
Linda Haller  
Thomas Tycz  
Ronald Repasi

# COVINGTON & BURLING

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FEDERAL COMMUNICATIONS COMMISSION  
U.S. DEPARTMENT OF COMMERCE

February 10, 2000

## VIA HAND DELIVERY

Magalie Roman Salas  
Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street S.W.  
Room TW-A325  
Washington D.C. 20554

Re: Petition Of OnSat Network Communications, Inc. for Declaratory Order and  
Waiver and Request for Expedited Action  
SAT-PDR-19990910-00091

Dear Ms. Salas:

This letter serves to supplement the above-captioned filing of September 10, 1999,<sup>1</sup> and to inform the Commission that the petition of OnSat Network Communications, Inc. ("OnSat") is now **unopposed**.

In brief, OnSat's petition urged the Commission to facilitate the provision of broadband, interactive, high speed wireless services to underserved communities using C-Band satellite capacity and equipment. OnSat suggested that the time for processing the antenna licenses necessary to provide such services is too long, that the process is too expensive, and that the Commission could speed the launch of these services by streamlining certain aspects of its licensing procedures (without relaxing the substantive requirements for coordination between satellite and terrestrial users). What OnSat has in mind, as reflected in its petition and in subsequent filings,<sup>2</sup> is a procedure whereby a service provider would file a single Form 312 application with the Commission seeking authorization to activate a number of earth stations, in which the stations' technical and operational features would be specified, the satellite would be identified and the coordination limits set forth. Although this would be the only authorization the provider would need and the only fee it would pay, the provider would have to make public

---

<sup>1</sup> The petition appeared on public notice in Report No. SAT-00026 (rel. Sept. 23, 1999).

<sup>2</sup> See, e.g., OnSat's Reply to Opposition to Petition for Declaratory Order and Waiver Request and Request for Expedited Action (Nov. 4, 1999).

Ms. Salas

February 10, 2000

Page 2

detailed information on such earth stations and complete coordination before activating them. In procedural terms, OnSat sought a declaratory ruling that 47 U.S.C. § 25.11(c) is available for certain very small aperture terminal satellite network operations at C-Band and that 47 U.S.C. § 25.212 (d) could be waived to the extent necessary to permit routine licensing of certain 3.7 meter transmit and receive stations at C-Band. OnSat's petition was supported by two entities and opposed by one: the Fixed Wireless Communications Coalition ("FWCC").<sup>3</sup>

After a series of discussions with counsel for the FWCC, OnSat has agreed to modify its petition as described below and the FWCC has agreed to withdraw its opposition in light of those amendments.

- In addition to the notices specified in its petition, OnSat now proposes that the provider will give notice of earth stations that were planned but not built, of earth stations that have been deactivated, and of any change in satellite location.
- OnSat agrees to coordinate only 20 MHz at three different orbital slots in connection with a streamlined, VSAT application.<sup>5</sup>

---

<sup>3</sup> The Commission implemented a similar procedure in the 1980's for the C-Band equatorial service. See, e.g., *In re Equatorial Communication Services Request for Permission to Operate a Limited Number of Earth Terminal Antennas*, File No. 663-DSE-ML-87, Order (rel. July 10, 1987).

<sup>4</sup> See *Opposition to Petition for Declaratory Order, Opposition to Waiver Request, and Opposition to Request for Expedited Action* (filed Oct. 25, 1999); OnSat's Petition was supported by HBO and JDL Technologies.

<sup>5</sup> Such proposed use is consistent with the principles articulated in the FWCC's previously filed Request for Declaratory Ruling and Petition for Rulemaking (filed May 5, 1999). The petition appeared on public notice in Report No. 2334 (rel. June 11, 1999). OnSat takes no position on the FWCC's petition or on C-Band earth station licensing parameters in the large, nor does it concede that the bandwidth accommodation it makes here actually constitutes twice OnSat's demonstrated needs (in fact, it is less than that).

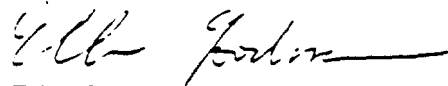
COVINGTON & BURLING

Ms. Salas  
February 10, 2000  
Page 3

\* \* \*

Counsel for the FWCC has represented to the undersigned that the FWCC will shortly file to withdraw its opposition to OnSat's petition in view of this submission. In light of this action, and given the consensus that more decisive action needs to be taken to speed the provision of broadband services to underserved (and often uneconomically served) communities, the FCC should move swiftly to implement OnSat's proposals.

Sincerely yours,



Ellen P. Goodman

*Attorney for*  
***OnSat Network Communications, Inc.***

cc.

Leonard Robert Raish  
Mitchell Lazarus  
Thomas Keller  
Ari Fitzgerald  
Richard Engleman  
Julia Buchanan  
John Giusti  
Linda Haller  
Thomas Tycz  
Ronald Repasi